TRENDS IN
NEUROSCIENCES

REFERENCE EDITION

Volume 12

1989

CONTENTS

JANUARY

Research News

Neurite growth inhibition by CNS myelin proteins: a mechanism to confine fiber tracts?, *by M. Chiquet* 1

How many kinds of nicotinic acetylcholine receptor are there?, *by Joe Henry Steinbach and Catherine Ifune* 3

Perspectives

Long-term potentiation and kindling: how similar are the mechanisms?, *by Donald P. Cain* 6

Letters to the Editor

GABA and seizure initiation *in vivo*, *by M. Dragunow* 10

Reply from Taylor 11

The development of confocal microscopy, *by M. David Egger* 11

Reviews

Gap junctional communication and development, *by Sarah C. Guthrie and Norton B. Gilula* 12

Regulating the number and function of neuronal acetylcholine receptors, *by Darwin K. Berg, R. Thomas Boyd, Stanley W. Halvorsen, Linda S. Higgins, Michele H. Jacob and Joseph F. Margiotta* 16

Analysing cell lineage with a recombinant retrovirus, *by Joshua R. Sanes* 21

Molecular determinants of GABAergic local-circuit neurons in visual cortex, *by Janice R. Naegele and Colin J. Barnstable* 28

Molecular mechanisms of olfaction, *by Solomon H. Snyder, Pamela B. Sklar, Paul M. Hwang and Jonathan Pevsner* 35

Book Reviews

Developmental and Evolutionary Aspects of the Neural Crest (edited by Paul Maderson), *by Peter Thorogood* 38

Microelectrode Techniques: The Plymouth Workshop Handbook (edited by N. B. Standen, P. T. A. Gray and M. J. Whitaker), *by Richard W. Aldrich* 39

Eye, Brain and Vision (by David H. Hubel), *by A. M. Sillitoe* 40

Books Received 41

FEBRUARY

Research News

Calcium oscillations in non-excitable cells, *by Timothy J. Rink and Ron Jacob* 43

Mapping genes for manic-depression and schizophrenia with DNA markers, *by William Byerley, Charles Mellon, Peter O'Connell, Jean-Marc Lalouel, Yusuke Nakamura, Mark Leppert and Ray White* 46

Perspectives on Disease

The role of environmental toxins in the etiology of Parkinson's disease, *by Caroline M. Tanner* 49

Techniques

Flash photolysis of caged compounds: new tools for cellular physiology, *by J. H. Kaplan and A. P. Somlyo* 54

Reviews

Toxins in the characterization of potassium channels, *by N. A. Castle, D. G. Haylett and D. H. Jenkinson* 59

The role of dynein in retrograde axonal transport, *by R. B. Vallee, H. S. Shpetner and B. M. Paschal* 66

A role for glia in the development of organized neuropilar structures, *by Leslie P. Tolbert and Lynne A. Oland* 70

Correlated firing of retinal ganglion cells, *by David N. Mastronarde* 75

Book Review
The Heritage of Experimental Embryology (by Viktor Hamburger), *by J. B. Gurdon* 80

Books Received 80

MARCH

Research News
Multipotent cells in the avian neural crest, *by Andrew Lumsden* 81
New roles for PDGF and CNTF in controlling the timing of glial cell differentiation in the optic nerve, *by David J. Anderson* 83
Arthritis and the nervous system, *by Maria Fitzgerald* 86

Perspectives on Disease
Familial amyloidotic polyneuropathy, *by Merrill D. Benson* 88

Letters to the Editor
The role of muscle spindles: a functional-morphological view, *by Jacob L. Dubbeldam* 93
Reply from Stein and Capaday 93

Reviews
Cytochrome oxidase: an endogenous metabolic marker for neuronal activity, *by Margaret T. T. Wong-Riley* 94
A multifaceted approach to neural development, *by Donald F. Ready* 102
Sensory control of target acquisition, *by Paul J. Cordo and Martha Flanders* 110
Calcium channel regulation by calcineurin, a Ca^{2+}-activated phosphatase in mammalian brain, *by David L. Armstrong* 117

Books in Brief
Intrinsic Determinants of Neuronal Form and Function (edited by R. J. Lasek and M. M. Black), *by Paul C. Letourneau* 122
Comparative Invertebrate Neurochemistry (edited by G. G. Lunt and R. W. Olsen), *by P. N. R. Usherwood* 122
Molecular Neurobiology of the Olfactory System: Molecular, Membranous, and Cytological Studies (edited by Frank L. Margolis and Thomas V. Getchell), *by Robert R. H. Anholt* 122

Books Received 123

APRIL

Research News
Site-directed mutagenesis and single-channel currents define the ionic channel of the nicotinic acetylcholine receptor, *by John A. Dani* 125
More than a Ca^{2+} channel?, *by Bruce Bean* 128

Perspectives on Disease
Molecular genetic studies in the neuropsychiatric disorders, *by Joseph B. Martin* 130

Viewpoint
Event or emergency? Two response systems in the mammalian superior colliculus, *by P. Dean, P. Redgrave and G. W. M. Westby* 137

Letter to the Editor
Microelectrode Techniques – A Workshop, *by David Ogden* 147

Reviews
The molecular basis of muscarinic receptor diversity, *by Tom I. Bonner* 148
Molecular genetic approaches to Alzheimer's disease, *by Rudolph E. Tanzi, Peter H. St George-Hyslop and James F. Gusella* 152
The patch-clamp technique in the study of secretion, *by Reinhold Penner and Erwin Neher* 159

Book Review
Neuromethods Volume 9: The Neuronal Microenvironment (by Alan A. Boulton, Glen B. Baker and Wolfgang Walz), *by N. R. Saunders* 163

MAY

Research News
Promiscuous behaviour in the steroid hormone receptor superfamily, *by David D. Moore* 165
'Slow virus' dementias: prion gene holds the key, *by John Hardy* 168

Viewpoint
The taxonomy of invertebrate neurons: a plea for a new field, *by C. H. F. Rowell* 169
Resolving the structural basis for developmental changes in muscle ACh receptor function: it takes nerve, *by Paul Brehm* 174

Perspectives on Disease
Lyme disease, *by Andrew R. Pachner* 177

Letters to the Editor
Environmental toxins and Parkinson's disease, *by Roger Barker, and by P. J. Harrison and R. C. A. Pearson* 182
Reply from Tanner 182

Reviews
Molecular and genetic analysis of *Drosophila* eye development: *sevenless, bride of sevenless* and *rough, by S. Lawrence Zipursky* 183
Understanding the molecules of neural cell contacts: emerging patterns of structure and function, *by Arthur D. Lander* 189
Neural prosthetic interfaces with the nervous system, *by Gerald E. Loeb* 195

Book Review
Why We Sleep: The Functions of Sleep in Humans and Other Mammals (by James Horne), *by Paul H. Harvey* 201

JUNE

Research News
What distinguishes axons from dendrites? Neurons know more than we do, *by Peter B. Sargent* 203
Pursuing the functions of vertebrate homeobox genes: progress and prospects, *by Peter W. H. Holland* 206
Down on chromosome 21?, *by John Hardy, Nick Irving and Anna Kessling* 209

Reviews
The basis of polarity in neurons, *by Mark M. Black and Peter W. Baas* 211
Cholinergic and noradrenergic modulation of thalamocortical processing, *by David A. McCormick* 215
Unraveling prion diseases through molecular genetics, *by David Westaway, George A. Carlson and Stanley B. Prusiner* 221
A new neuronal intermediate filament protein, *by Lloyd A. Greene* 228

Book Reviews
Spatial Vision (by Russell L. De Valois and Karen K. De Valois), *by Randolph Blake* 230
Sensory Biology of Aquatic Animals (edited by J. Atema, R. R. Fay, A. N. Popper and W. N. Tawolga), *by T. Szabo* 231
Archivist (supplied by IRL Press), *by Geoffrey Einon* 232
The Neural and Behavioural Organisation of Goal-Directed Movements (by Marc Jeannerod), *by Peter B. C. Matthews* 233

Books Received 234

JULY

Research News
Tissue-specific isoforms of dystrophin, *by Frank S. Walsh, John A. Pizzey and George Dickson* 235
Growth at the growth cone, *by Phillip R. Gordon-Weeks* 238

Viewpoint
Neural Edelmanism, *by Francis Crick* 240
Neuronal laminin receptors, *by David Edgar* 248
The neurotrophic theory and naturally occurring motoneuron death, *by Ronald W. Oppenheim* 252

Letters to the Editor
Familial amyloidotic polyneuropathy, *by J. Haan, R. A. C. Roos and S. G. van Duinen* 256
Reply from Benson 256
Trophic mechanisms are not enough, *by Stephen Dunnett and Ole Isacson* 257

Reviews
Olfactory cortex: model circuit for study of associative memory?, *by Lewis B. Haberly and James M. Bower* 258
Neurotransmitter regulation of neuronal outgrowth, plasticity and survival, *by Stuart A. Lipton and Stanley B. Kater* 265

Book Reviews
Auditory Function: Neurobiological Bases of Hearing (edited by Gerald M. Edelman, W. Einar Gall and W. Maxwell), *by Adrian Rees* 270
Dahlem Workshop Report: Neurobiology of Neocortex (edited by P. Rakic and W. Singer), *by C. Dehay* 271

Books in Brief
Therapeutic Claims in Multiple Sclerosis (2nd edn) (edited by William A. Sibley), *by Robert McConnell* 272
A Colour Atlas of Multiple Sclerosis and Other Myelin Disorders (by Colin Adams), *by Robert McConnell* 272
The Forebrain of Reptiles: Current Concepts of Structure and Function (edited by W. K. Schwerdtfeger and W. J. A. J. Smeets), *by B. Fritzsch* 272
Neurohormones in Invertebrates (edited by M. C. Thorndyke and G. J. Goldsworthy), *by P. N. R. Usherwood* 273
Auditory System: Structure and Function (edited by J. Syka and R. B. Masterton), *by David R. Moore* 273

Books Received 273

AUGUST

Research News
N-Cadherin: a cell adhesion molecule in neural development, *by Urs Rutishauser* 275
When are neurones specified?, *by Jack Price* 276

Viewpoint
Co-existence of galanin and acetylcholine: is galanin involved in memory processes and dementia?, *by Jacqueline N. Crawley and Gary L. Wenk* 278

Techniques
In vivo functional localization of the human visual cortex using positron emission tomography and magnetic resonance imaging, *by Bassem N. Mora, George J. Carman and John M. Allman* 282

Letters to the Editor
What causes membrane fusion in exocytosis?, *by D. P. L. Green* 285
Reply from Penner and Neher 285
Excitatory amino acids and the basal ganglia: implications for the therapy of Parkinson's disease, *by T. Klockgether and L. Turski* 285

Reviews
Central representations of human limb movement as revealed by studies of drawing and handwriting, *by Francesco Lacquaniti* 287
Pharmacological analysis of cortical circuitry, *by Jürgen Bolz, Charles D. Gilbert and Torsten N. Wiesel* 292
Principles of visual motion detection, *by Alexander Borst and Martin Egelhaaf* 297

Book Reviews
Cell Culture Approaches to Invertebrate Neuroscience (edited by D. J. Beadle, G. Lees and S. B. Kater), *by Chris Reddies and Ron McKay* 306
Noradrenergic Innervation of Blood Vessels (Vol. 1: Putative Neurotransmitters. Vol. 2: Regional Innervation), (edited by Geoffrey Burnstock and Susan Griffith), *by T. B. Bolton* 307
Duchenne Muscular Dystrophy (Oxford Monographs on Medical Genetics 15) (revised edn) (by Alan E. H. Emery), *by Margaret E. Smith* 307
Plasticity of the Neuromuscular System (Ciba Foundation Symposium 138), (edited by D. Evered and J. Whelan), *by R. Victoria Stirling* 308

Books in Brief
Current Issues in Neural Regeneration Research (Neurology and Neurobiology, Vol. 48) (edited by Paul J. Reier, Richard P. Bunge and Frederick J. Seil), *by Jonathan Clarke* 309

SEPTEMBER

Research News
Have cycles in the courtship song of *Drosophila* been detected?, *by F. von Schilcher* 311
Dendrite processing in more ways than one, *by Jørn Hounsgaard and Jens Midtgaard* 313

Viewpoint
The monoaminergic innervation of the cerebral cortex is not diffuse and nonspecific, *by John G. Parnavelas and Georgios C. Papadopoulos* 315
Affective disorders and *S*-adenosylmethionine: a new hypothesis, *by Giulio L. Cantoni, S. Harvey Mudd and V. Andreoli* 319

Techniques
Combating poster fatigue: how to use visual grammar and analysis to effect better visual communications, *by John D. Woolsey* 325
DiI and DiO: versatile fluorescent dyes for neuronal labelling and pathway tracing, *by Marcia G. Honig and Richard I. Hume* 333

Reviews
The determination of neuronal fate in the cerebral cortex, *by Susan K. McConnell* 342
Glycine modulation of the NMDA receptor/channel complex, *by Alex M. Thomson* 349
Neurobiology of polarization vision, *by Rüdiger Wehner* 353

Book Reviews
The Neural Crest (by Brian Hall and Sven Hörstadius), *by Marianne Bronner-Fraser* 359
Nerve Cells and Animal Behaviour (by David Young), *by Alan Roberts* 360
Movements of the Eyes (by R. H. S. Carpenter), *by Han Collewijn* 360

Books in Brief
The Na^+, K^+-pump Part A: Molecular Aspects (Progress in Clinical and Biological Research, Vol. 268A) (edited by Jens C. Skou, Jens G. Nørby, Arvid B. Maunsbach and Mikael Esmann), *by Douglas Fambrough* 361
Developmental Neurobiology of the Frog (edited by Emanuel D. Pollack and Harold D. Bibb), *by Jeremy S. H. Taylor* 362

OCTOBER

Research News
Gap-43 – What does it do in the growth cone? *by Phillip R. Gordon-Weeks* 363

Perspectives on Disease
The functional anatomy of basal ganglia disorders, *by Roger L. Albin, Anne B. Young and John B. Penney* 366

Techniques
Lessons from magnetic resonance imaging in multiple sclerosis, *by W. I. McDonald and D. Barnes* 376

Reviews
Language, modality and the brain, *by Ursula Bellugi, Howard Poizner and Edward S. Klima* 380
Developmental assembly of learning in *Aplysia*, *by Thomas J. Carew* 389
The neural basis of mental imagery, *by Martha J. Farah* 395
Do cortical areas emerge from a protocortex?, *by Dennis D. M. O'Leary* 400
In vivo voltammetry – prospects for the next decade, *by Jonathan A. Stamford* 407

Book Reviews
Cell Surface Antigen Thy-1: Immunology, Neurology and Therapeutic Applications (edited by Arnold E. Reif and Michael Schlesinger), *by H. M. Charlton* 413
Human Brain Electrophysiology: Evoked Potentials and Evoked Magnetic Fields in Science and Medicine (by David Regan), *by Aled Jeffreys* 413
HTLV-1 and the Nervous System (edited by Gustavo C. Roman, Jean-Claude Vernant and Mitsuhiro Osame), *by Lewis P. Rowland* 414

Books in Brief
Novel Infectious Agents and the Central Nervous System (Ciba Foundation Symposium 135) (edited by G. Bock and J. Marsh), *by Robert G. Rohwer* 415
Aspects of Autism: Biological Research (edited by Lorna Wing), *by Patricia M. Merjanian* 416
Annual Review of Neuroscience (Vol. 12) (edited by W. Maxwell Cowan) 416

Books Received 416

NOVEMBER

Special Issue – Calcium-Effector Mechanisms

Introduction

Regulation of neuronal function by calcium, *by Mary B. Kennedy* 417

Reviews

The physiological role of calcium-dependent channels, *by A. Marty* 420

The mechanism of protein kinase C activation, *by Kuo-Ping Huang* 425

Calmodulin, cell growth and gene expression, *by Colin D. Rasmussen and Anthony R. Means* 433

The calpains, *by E. Melloni and S. Pontremoli* 438

The impact of postsynaptic calcium on synaptic transmission – its role in long-term potentiation, *by R. C. Malenka, J. A. Kauer, D. J. Perkel and R. A. Nicoll* 444

Calcium-dependent and calcium-independent exocytosis, *by D. E. Knight, H. von Grafenstein and C. M. Athayde* 451

Stimulus–transcription coupling in neurons: role of cellular immediate-early genes, *by James I. Morgan and Tom Curran* 459

The EF-hand family of calcium-modulated proteins, *by Anthony Persechini, Nancy D. Moncrief and Robert H. Kretsinger* 462

Calcium and polyphosphoinositide control of cytoskeletal dynamics, *by Paul Forscher* 468

The mechanism and regulation of fast axonal transport, *by Michael P. Sheetz, Eric R. Steuer and Trina A. Schroer* 474

Books Received 479

DECEMBER

Research News

Retinal axon guidance: near or far?, *by Sarah Guthrie* 481

Reassessing the cholinergic basal forebrain: nomenclature schemata and concepts, *by Larry L. Butcher and Kazue Semba* 483

Obituary

H. G. J. M. Kuypers (1925–1989), *by Hendrik Van der Loos* 485

Techniques

Trends in confocal microscopy, *by T. Wilson* 486

Letters to the Editor

Signal-to-noise in neuromodulation, *by Lawrence J. Ryan* 494

Reply from McCormick 494

Neurotrophic theory, *by Peter G. H. Clarke, Pierre Blaser and Stefano Catsicas, and by M. B. Lowrie and Gerta Vrbová* 494 495

Reviews

Autoimmunity to the voltage-gated calcium channel underlies the Lambert–Eaton myasthenic syndrome, a paraneoplastic disorder, *by Angela Vincent, Bethan Lang and John Newsom-Davis* 496

Looking into growth cones, *by Daniel J. Goldberg and Donald W. Burmeister* 503

Neural mechanisms involved in cardiovascular control during affective behaviour, *by K. M. Spyer* 506

Tactile sensing of surface features, *by K. Sathian* 513

Book Reviews

Cajal on the Cerebral Cortex. An Annotated Translation of the Complete Writings. (History of Neuroscience, No. 1) (by Javier DeFelipe and Edward G. Jones), *by Hendrik Van der Loos* 520

Neuronal and Cellular Oscillators (Cellular Clocks Series, Vol. 2) (edited by Jon W. Jacklet), *by Nicholas Dale* 521

Electric Fields in Vertebrate Repair (by R. B. Borgens, K. R. Robinson, J. W. Vanable, Jr and M. E. McGinnis), *by Claudio D. Stern* 522

Books in Brief

Pineal Research Reviews (Vol. 7) (edited by R. J. Reiter), *by J. Herbert* 522

Basic Mechanisms of Headache (Pain Research and Clinical Management Vol. 2) (edited by Jes Oleson and Lars Edvinsson), *by Paul T. G. Davies* 523

Calmodulin (edited by Philip Cohen and Claude B. Klee), *by H. A. Robertson* 523

The Wernicke–Korsakoff Syndrome and Related Neurologic Disorders due to Alcoholism and Malnutrition (by Maurice Victor, Raymond D. Adams and George H. Collins), *by Roger F. Butterworth* 523

ERRATA

Flash photolysis of caged compounds: new tools for cellular physiology, *by J. H. Kaplan and A. P. Somlyo* (February, pp. 54–59) 158

Unraveling prion diseases through molecular genetics, *by David Westaway, George A. Carlson and Stanley B. Prusiner* (June, pp. 221–227) 309

Olfactory cortex: model circuit for study of associative memory, *by Lewis B. Haberly and James M. Bower* (July, pp. 258–264) 388